DOCUMENT RESUME

ED 156 438 SE 024 319

TITLE Lawn Weeds and Their Control. North Central Regional Extension Publication No. 26.
INSTITUTION Purdue Univ., Lafayette, Ind. Cooperative Extension Service.
PUB DATE 77
NOTE 25p.; Colored photographs will not reproduce well; Contains occasional small print in Tables

EDRS PRICE MF-$0.83 HC-$1.67 Plus Postage.
DESCRIPTORS *Herbicides; *Instructional Materials; *Manuals; Plant Growth; Plant Identification; *Post Secondary Education; Safety; *Weeds

ABSTRACT

This publication discusses lawn weed control for the twelve state north central region of the country. Written for use by homeowners, the publication focuses on weed identification and proper herbicide selection and application. Identification of weeds and safe and appropriate herbicide use are emphasized. Forty-six weed and turf plants are described and are pictured for identification. Growth habits of these plants are also included. Management of weeds and control methods are suggested to supplement or reduce the use of herbicides. The common names of various herbicides are given. Herbicide formations and liquid application methods are discussed. Also included are a table showing growth and treatment periods for weeds and a table listing weed responses to herbicides. (MR)

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North Central Regional
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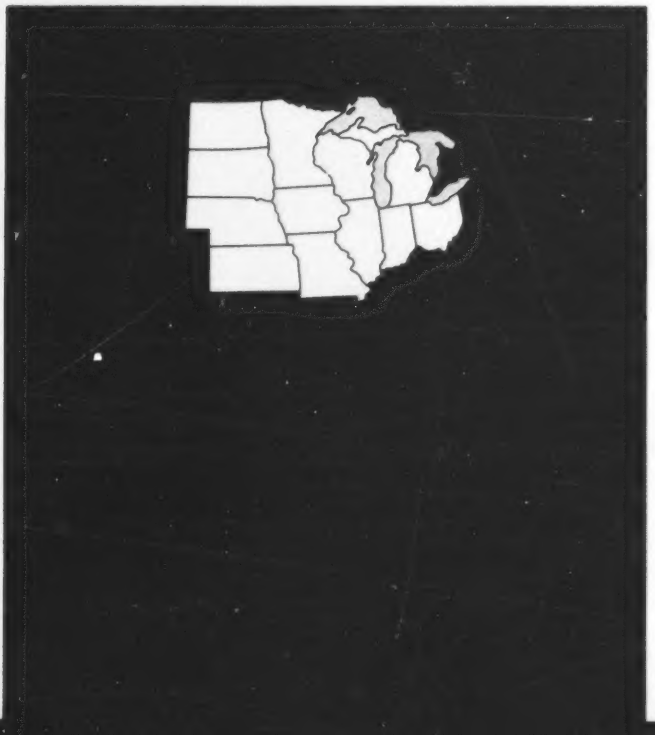
Lawn Weeds and their Control



SE 024 319

Cooperative Extension Work in Agriculture and Home Economics, State of Indiana, Purdue University and U. S. Department of Agriculture Cooperating. H. G. Diesslin, Director, Lafayette, Ind. Issued in furtherance of the Acts of May 8 and June 30, 1914.

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ACKNOWLEDGMENTS

This bulletin was prepared as a Regional Publication by authorization of the North Central Agricultural Extension Services. The publication is an adaptation and expansion of Nebraska Extension Circular 68–178 *Lawn Weeds and Their Control* by John D. Furrer, originally published in 1968.

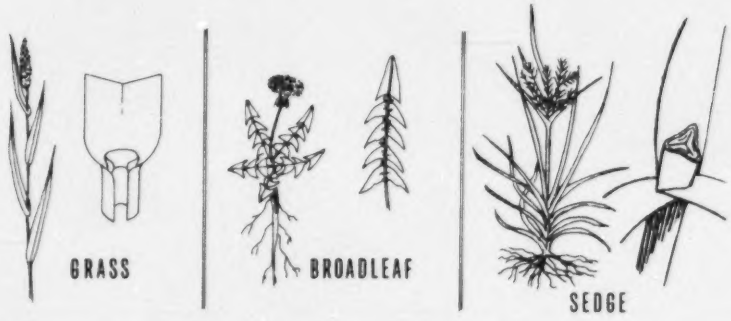
Responsible Committee as appointed by the North Central Weed Control Conference is: John D. Furrer, Extension Specialist, University of Nebraska, Chairman; Larry W. Mitich, Extension Weed Specialist, North Dakota State University, and James L. Williams, Jr., Extension Weed Specialist, Purdue University.

Suggestions, advice, and special assistance were rendered by weed scientists and turf specialists from the North Central Region.

Control recommendations are based on research results in the North Central Region, USDA recommendations, and label registrations. Suggestions are designed to benefit when control programs are needed. Recommendations are subject to withdrawal or change at any time. In some instances, trade names have been used to simplify recommendations. No endorsement is implied and no discrimination is intended.

Lawn Weeds and Their Control

Homeowners with well-kept lawns often spend three to five dollars per 1,000 square feet for weed control. Correct identification, selection of the right herbicide (weed killer) and proper application are essential for the successful control of weeds. Knowledge of plant characteristics and growth habits is helpful with both identification and control.



Grasses, Broadleaves, and Sedges

There are three basic kinds of weeds: Grasses, broadleaves and sedges.

True *grasses* have jointed hollow stems; the leaf blades have parallel veins and are several times longer than they are wide; the root systems are fibrous; most seed heads are similar to small grain. Foxtail and quackgrass are typical grasses.

Broadleaf weeds often have showy flowers; the leaves have a network of small veins originating from a principal vein which divides the leaf in half; a strong main root called a taproot is usually present. Dandelion and knotweed are typical broadleaf species.

Sedges are grass-like plants with three-cornered stems which bear leaves extending in three directions. They are neither true grasses nor true broadleaves. Yellow nutsedge is an example.

Annuals, Biennials, Perennials

Several additional groupings could be made but from a control standpoint, determination of life span—annual, biennial or perennial—is most important.

An *annual* germinates from seed, grows, matures, and dies in less than 12 months or when killed by frost. Crabgrass, foxtail and prostrate knotweed are examples of annuals. Many annual weeds are effectively controlled with preemergence herbicides (chemicals applied to the soil to stop growth from seed). After weeds appear, postemergence herbicides (applied to the growing plant after emergence) work most effectively if used about 30 days after emergence.

A winter annual starts its life cycle in the fall and completes it the next spring. Henbit and shepherdspurse are winter annuals. Herbicides for their control are applied in the fall or early spring.

Biennials require two years to complete their life cycle. They form a rosette and store food in their fleshy root the first year and flower the second year. Many thistles are biennials. Control measures are most effective when applied during the first year's growth. If treatment is delayed until the second year, early season application of herbicide before bloom is important.

Perennials live more than two years. Field bindweed and white clover are typical perennials. Chemical control of perennials works best when applied to actively growing and well developed foliage about 30 to 40 days after spring growth begins. Late fall is a good time to treat perennials that resume growth after summer dormancy.

Cool Season—Warm Season

Cool season plants grow best during cool periods and mature or go dormant during the hottest part of the summer. Bluegrass and dandelions are cool season perennials. Winter annuals also are cool season plants.

Timely chemical control for cool season species coincides with periods of active growth in fall and early spring. Preemergence weed killers for the control of cool season annuals that germinate in the spring (knotweed for example) must be applied before March 15 in the southern part of the region and April 15 in the northern part.

Plants that remain dormant vegetatively or as seed that does not germinate until temperatures warm up in May and June are known as *warm season* plants. Crab grass, foxtail and prostrate spurge are typical warm season annuals. Germination of warm season annuals occurs approximately April 15 in the south and May 15 in the north. This gives additional time for application of preemergence chemicals.

Warm season perennial grasses such as nimblewill present objectionable appearances in cool season lawns. They remain dormant and brown in the spring 45 or more days longer than bluegrass. In the fall, warm season species turn brown after the first frost; cool season grasses usually remain green an extra 30 days or more.

Identification Aids

Comparison of a weed with a picture is the easiest way to identify an unknown. Note the distinctive characteristics listed for each species. Observe the growth habits. Does the plant grow upright or prostrate? Is the stem fleshy? Does it contain milky sap? Does it root at the nodes (joints)? Does it have a square stem? Note whether a plant is annual, biennial, or perennial; cool season or warm season.

For example, a green weedy grass found in early spring is not crabgrass, foxtail, or nimblewill since they do not start growth that early.

Barnyardgrass (Echinochloa crusgalli L.)

A coarse warm season annual grass with a flattened stem especially near the base. Lower portion of the plant tends to be reddish purple. The seed head branches into 6 or 8 short compact segments.

Nebr. Dept. of Agric.

Barnyardgrass

Bluegrass, annual (Poa annua L.)

A low-growing, compact, tufted winter annual. Some flattened stems may lie close to the ground. It does not have rhizomes. Leaves are soft, light-green and boat-shaped at the tip. Starts growth from seed in early fall and often grows throughout winter. Can produce seed heads when mowed at ¼". May die suddenly during summer months.

Other names: Poa annua.

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Annual Bluegrass

Brome, smooth (Bromus inermis Leyss.)

A cool season perennial. Many bluegrass lawns that contain smooth brome were started with pasture sod. The leaves are ⅜ to ½ inch wide and tend to be lax rather than upright. Close examination of an entire leaf will reveal an "M" or "W" across the leaf blade. The lower portion of the stem is almost white with prominent veins. Smooth brome spreads primarily by underground stems called rhizomes.

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Smooth Brome

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Crabgrass

Crabgrass (Digitaria spp.)

Crabgrass is one of the most common warm season annual grassy weeds. The stems grow mostly prostrate, branch freely and send down roots where each joint comes into contact with the soil or moist grass. Seed head is divided into several fingerlike segments. Two principal species are (1) large crabgrass (Digitaria sanguinalis L.) sometimes known as hairy crabgrass and (2) smooth crabgrass (Digitaria ischaemum Schreb.) Smooth crabgrass tends to be smaller, less hairy, and has purplish color on the stems.

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Tall Fescue

Fescue, tall (Festuca arundinacea Schreb.)

A very coarse cool season perennial bunch grass. Scattered clumps objectionable in fine textured turf grasses. Leaf veins are strongly fibrous. When mowed, fibers show on the cut edge, especially if mowers are not well sharpened. Mature leaf blades may be one-half inch wide, ribbed above and shiny smooth below. The lower portions of the stems are reddish purple, particularly in the spring and fall.

A similar grass, meadow fescue, (Festuca elatior L.) also is a frequent weed in bluegrass lawns.

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Foxtail

Foxtail (Setaria spp.)

Foxtails are warm season annuals. Yellow foxtail (Setaria glauca L.) has flattened stems that are often reddish colored on the lower portion. The stems of green foxtail (Setaria viridis L.) are round. The seed of yellow foxtail is four times as large as green foxtail. Giant foxtail (Setaria faberili) may be found in some lawns.

Goosegrass (Eleusine indica L.)

A decidedly warm season annual most often found growing where bluegrass stands are thin. Germinates later than crabgrass. The stems tend to be flattened and near the base are whitish in color. Flower heads are thicker and more robust than on common crabgrass. The extensive fibrous root system makes it difficult to pull.

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Goosegrass

Nimblewill (Muhlenbergia schreberi J. F.)

A warm season perennial grass. The wiry fine stems root at the nodes; root system is shallow and fibrous; forms circular patches or may be distributed throughout lawn. Objectionable in bluegrass lawns because of delayed spring growth and early dormancy in the fall.

Left: Conspicuous patches of dormant nimblewill scattered throughout Kentucky bluegrass.

Right: Close-up of nimblewill.

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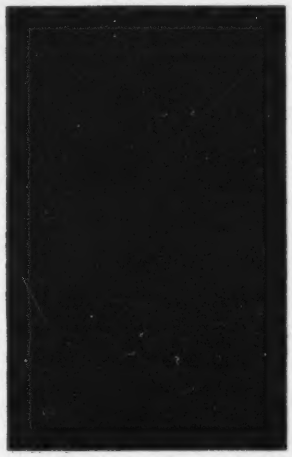

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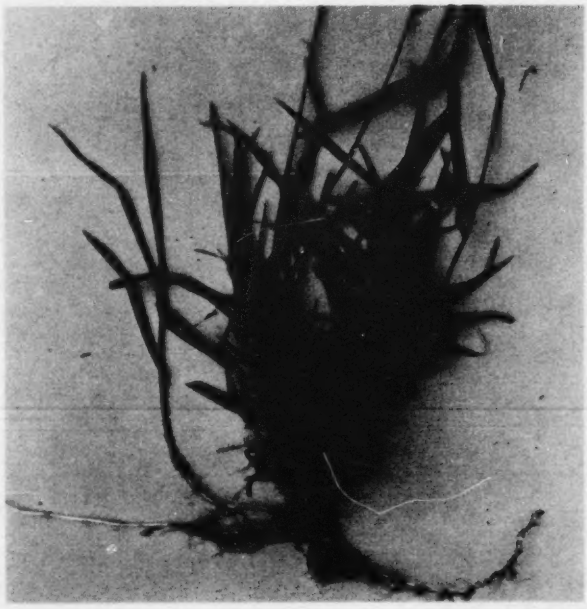
Nimblewill

Quackgrass (Agropyron repens L.)

A cool season perennial wheatgrass that spreads extensively by long white rhizomes (underground stems). Leaf blades are twice the width of bluegrass and tend to be rough in texture. A claw-like protrusion of the leaf called an auricle clasps the stem. One of the most distinguishing characteristics is a ring of root hairs every ¾ to 1 inch along the rhizomes. The lower leaf sheath of the stem is hairy.

Other common names: Couchgrass.



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Quackgrass

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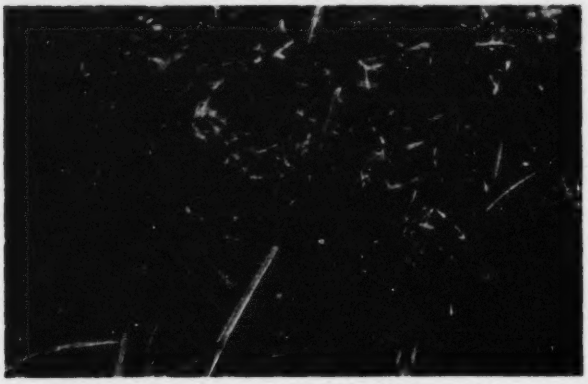
Sandbur

Sandbur (Cenchrus spp.)

A warm season annual grass most often found in sandy turf areas that have been on low maintenance programs. Stems are flattened and branched; may be confused with yellow foxtail before formation of the spiny burs.



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Yellow Nutsedge

Nutsedge, yellow (Cyperus esculentus L.)

Warm-season perennial. Triangular stems of sedges produce 3-ranked leaves from near the ground. Leaves light yellow-green and rather harsh. Lower portion of plant is fibrous and brown. Roots often terminate with small nutlets, about the size of a kernel of popcorn. Seed heads appear burlike. Plants grow rapidly in July and August. Several species of sedge are common to our region but this one is most prevalent in lawns.

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Bedstraw

Bedstraw (Galium spp.)

Cool season plants, generally annuals, most often found in the dense shade of trees and shrubs. The leaves and leaflike parts (stipules) form whorls at distinct intervals along the weak stems. The square stems have tiny saw-toothed appendages which cause plants to stick together and to clothing. The flowers are small with four white petals.

Other names: Cleavers.

Bellflower, creeping (Campanula rapunculoides L.)

An escape from cultivation that can become a troublesome weed in lawns. The nodding, bell-shaped flowers are showy, ranging from a deep blue to purple. Creeping bellflower is a cool-season perennial with a root system that is both fleshy and fibrous. The basal leaves are heart-shaped with long stems. The leaves on the flower stalks are long and narrow without stems.

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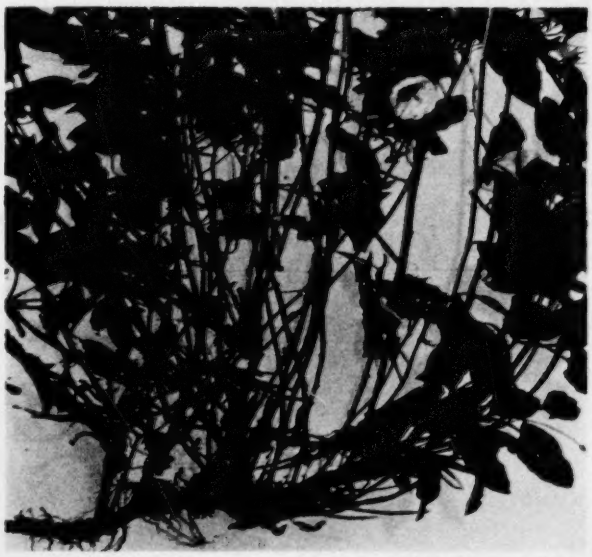
Creeping Bellflower

Bindweed, field (Convolvulus arvensis L.)

A deep rooted perennial vine common throughout most of the region. It is one of the more difficult weeds to control. The spade-shaped leaves have rounded tips and vary in size. The funnel shaped flowers vary from white to light pink and are about the size of a nickel. The plant readily climbs over shrubs and other ornamentals. It spreads by both seed and roots.

Other common names: Creeping jenny; perennial morning glory.



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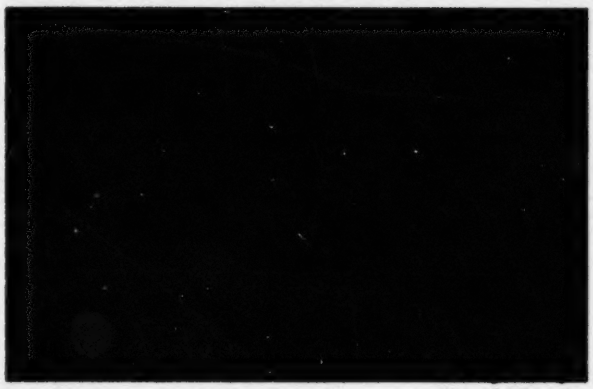
Field Bindweed

Carpetweed (Mollugo verticillata L.)

A late-starting, rapidly growing summer annual. The green, smooth stems branch along the ground in all directions from the root forming a flat circular mat on the soil surface. The light-green, smooth, tongue-like leaves are grouped five to six together forming whorls at each joint on the stem. Flowers are small, white, with several at each joint.



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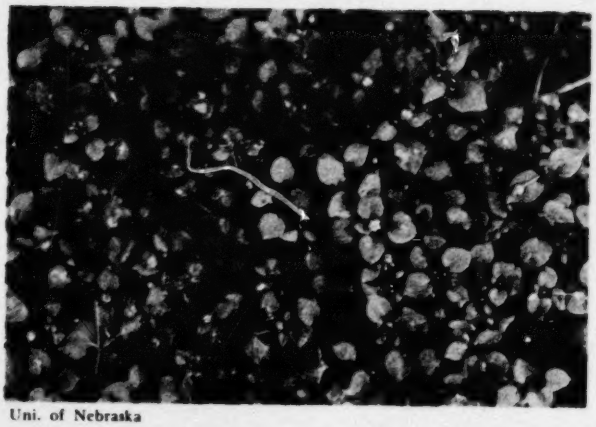
Carpetweed



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Common Chickweed

Chickweed, common (Stellaria media L.)

A hardy, low growing annual or winter annual with creeping stems that root at the nodes. It has a delicate appearance and is found in green form most of the year in milder climates. The small opposite leaves are oval-shaped and smooth. The small star-like flowers are white. Common chickweed is most often found in the shade of trees and shrubs and especially on the north side of buildings.

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Mouseear Chickweed

Chickweed, mouseear (Cerastium vulgatum L.)

A perennial with creeping stems that root at the nodes. The leaves are opposite, 2-3 times longer than wide, clammy, and hairy. Flowers have five white petals. The root system is shallow and fibrous.

Uni. of Nebraska

White Clover

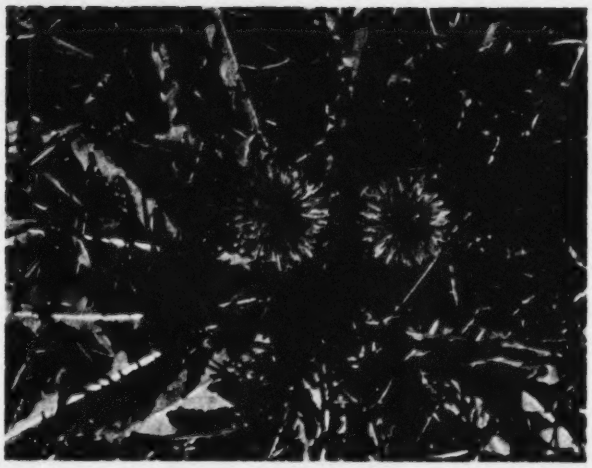
Clover, white (Trifolium repens L.)

A cool season perennial legume that spreads by underground and above ground stems. May or may not be objectionable in lawns, depending on individual preference. Flowers white, sometimes with a tinge of pink. Seeds will live for 20 or more years in the soil.

Other common names: White Dutch clover.

Dandelion (Taraxacum spp.)

Cool season perennials common throughout the region. The yellow flowers occur from early spring to late fall. The thick fleshy taproot, often branched, can give rise to new shoots. Seedlings may appear throughout the spring and summer and are often abundant in the fall.



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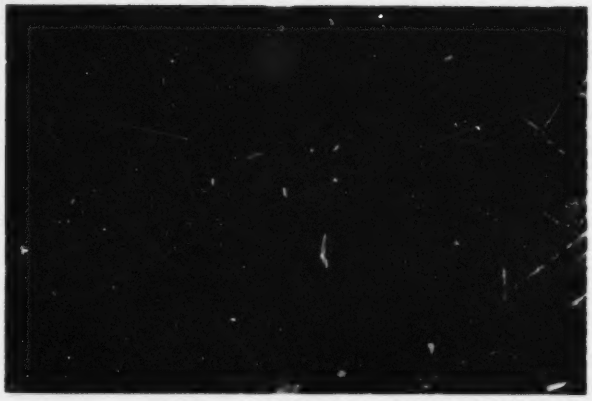
Dandelion

Deadnettle (Lamium purpureum L.)

A winter annual that starts growth in early fall. Slightly pubescent throughout. The squarish stems may be upright or spreading. Leaves are opposite with scalloped edges. Flowers purple red.



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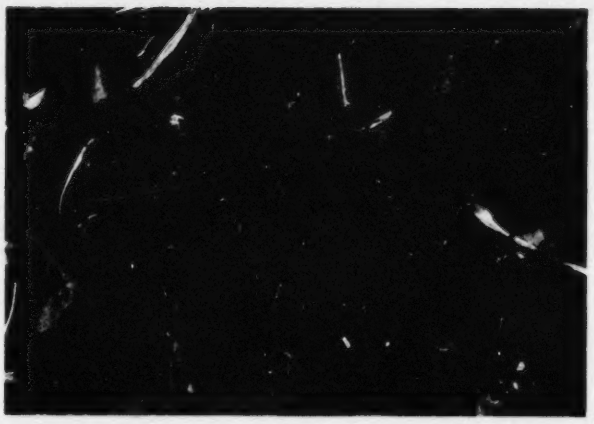
Deadnettle

Dock (Rumex spp.)

Dock seldom flowers when growing in lawns. The plant forms a large rosette. Curly dock (Rumex crispus L.) is most common. The leaves have crinkled edges. They are often tinted with red or purple color. Pale dock, also known as tall dock (Rumex altissimus Wood.), has leaves which tend to be more flat and broad. Both species have flowering stalks that may reach a height of two to three feet.



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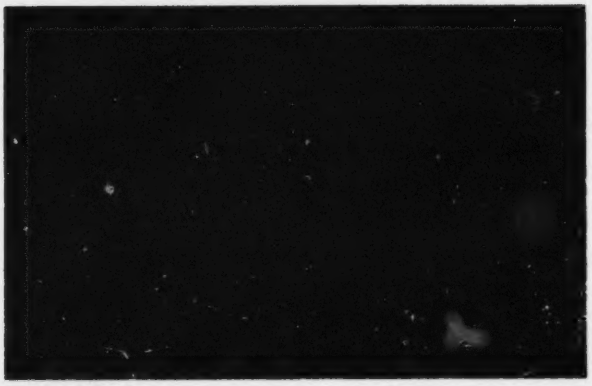
Dock



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Wild Garlic

Garlic, wild (Allium vineale L.)

The slender, smooth, leaves are hollow and attached to the lower portion of the waxy stems. Both bulbs and bulblets are produced underground and the green to purple flowers are often replaced with bulblets. There is a characteristic onion-garlic odor

Wild onion is similar to wild garlic but does not produce underground bulblets and the leaves are not hollow.

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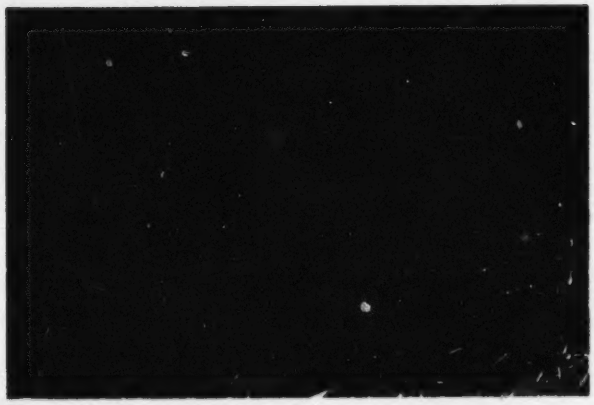
Henbit

Henbit (Lamium amplexicaule L.)

A winter annual that starts growth in September. Stems are squarish; plants usually upright. Flowers are lavender to blue. Leaves are opposite. A few plants may bloom in the fall but the majority blossom in early spring.



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Ground Ivy

Ivy, ground (Glechoma hederacea L.)

A cool season perennial originally introduced as a ground cover. Now a weed in many lawns. Thrives in shade, but will also grow in the sun. Ground ivy produces an abundance of lavender to blue funnel-form flowers in early spring. The square stems may root at each joint where they touch the ground.

Other common names: Creeping Charley.

Knotweed, prostrate (Polygonum aviculare L.)

An annual that thrives from early spring to late fall. Germination occurs in very early spring. Grows flat from a long white taproot. Individual plants may have a spread of 2 feet or more. Stems wiry, very leafy; at each leaf node there is a thin papery sheath. Leaves often have a bluish cast. Seeds are three-cornered, light-brown early and shiny black at maturity

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Prostrate Knotweed

Kochia (Kochia scoparia L.)

A versatile annual capable of adapting itself to a wide variety of environmental conditions. In lawns it assumes a prostrate habit of growth; if not mowed it may attain a height of 7 or 8 feet. The first leaves after germination are covered with a silvery pubescence. Germination starts in early spring and continues throughout the summer. Leaves and stems vary in color from greenish yellow to greenish red.

Other common names: Burning bush, summer cypress, Mexican fireweed.

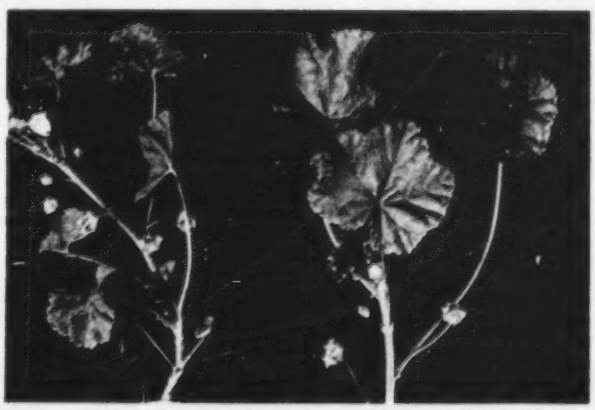
Uni. of Nebraska

Kochia

Mallow (Malva spp.)

Common mallow (Malva neglecta Wallr.) and dwarf mallow (Malva routoundifolia L.) are the most prevalent species. The long fleshy taproot is almost white. Flowers are bluish white. The seed portion is a flattened disc which breaks into 10 to 20 pie-shaped segments.

Other common names: Roundleaf mallow; cheeses.



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Mallow

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Black Medic

Medic, black (Medicago lupulina L.)

An annual legume with trailing stems that grow close to the ground. The taproot penetrates deeply into most soils. The three-leaflet leaves have prominent veins and are similar to most other clover leaves. The small clusters of flowers are bright yellow. Seed pods turn almost black at maturity. Black medic is most noticeable in lawns during June, July, and August.

Other common names: Yellow trefoil; Japanese clover.

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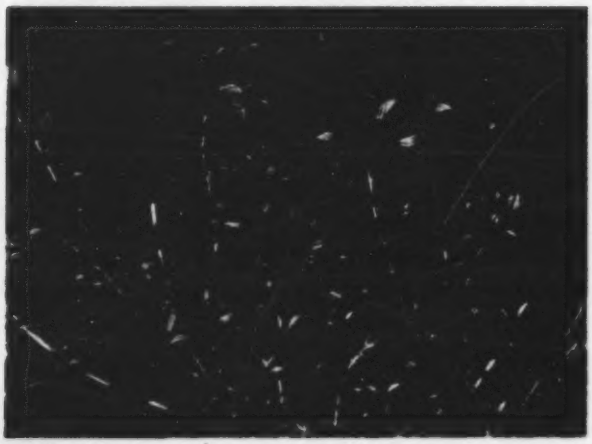
Moss

Moss

A primitive form of plant life consisting of many genera and species. Moss prefers an environment that is cool and moist. It is most often found in shaded areas such as the north side of buildings and on poorly drained soil.



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Prostrate Pigweed

Pigweed, prostrate (Amaranthus graecizans L.)

A warm season prostrate annual that grows from a pink taproot. The leaves are very shiny. Stems smooth, light-green to reddish green, may spread 1½ to 2 feet. Seeds are lens shaped, small, and shiny black.

Plantain, Blackseed and broadleaf

Cool season perennials that form rosettes with prominently veined leaves. The leaves of blackseed (Plantago rugelii Denc.) are oval shaped and 2–3 inches across with purplish stalks; broadleaf plantain (Plantago major L.) has smaller leaves without purplish coloration. Both species have rat-tail like seed heads that are several inches long.

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Plantain

Plantain, buckhorn (Plantago lanceolata L.)

Perennial. Has slender, narrow leaves that are about one inch across with 3–5 prominent veins. The seed head is a short cylindrical spike.

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Buckhorn Plantain

Punctureving (Tribulus terrestris L.)

A prostrate freely branching warm season annual. Plants slightly hairy. Some stems may be four or five feet long. Taproot. Leaflets bright green. Flowers yellow. Seeds angled, each with 2 stout spines that give a Texas longhorn appearance.

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Punctureving

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Purslane

Purslane, common (Portulaca oleracea L.)

A warm season annual. Leaves and stems fleshy or succulent, reddish in color. Grows prostrate. Root system tends to be fibrous; stems root wherever they touch the ground, particularly if the main root has been destroyed. Flowers small, yellow. Seeds very small, black.

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Shepherdspurse

Shepherdspurse (Capsella bursa-pastoris L.)

A winter annual. The deeply lobed leaves form rosettes in the fall that may be confused with dandelions; however, the leaves lack the milky sap. Blooms in very early spring. White flowers develop into triangular seed pods filled with numerous tiny reddish brown seeds. Individual seed pods held by their small stems resemble the purse once carried by shepherds.

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Red Sorrel

Sorrel, red (Rumex acetosella L.)

A low growing, cool season perennial that reproduces by creeping roots and seeds. Leaves are spear shaped. The lacy flowering stalks bloom in mid-spring with a definite reddish color. The seed is small, three-sided and reddish brown. Remains green from very early spring to early winter.

Other common names: Sheep sorrel.

Speedwell (Veronica spp.)

Several weedy species exist, most being winter or early spring annuals. Plants very low growing; leaf shapes vary with species but generally are small and numerous; flowers are light blue with white throats. Seed pods are divided and almost heart-shaped.

Uni. of Nebraska

Speedwell

Spurge, prostrate (Euphorbia supina, Raf.)

A prostrate growing warm season annual. Most prominent in July, August, and September. Milky sap; leaves with or without reddish brown spots. Seeds are borne in three's in a capsule.

Other common names: Milk spurge.

Uni. of Nebraska

Prostrate Spurge

Thistle, Canada (Cirsium arvense L.)

Perennial. May spread by horizontal roots. Leaf form may vary. Most varieties have dark green spiny lobed leaves with crinkled edges. Most common in the northern half of the region. The lavender flowers are ¾" or less in diameter.

Uni. of Nebraska

Canada Thistle

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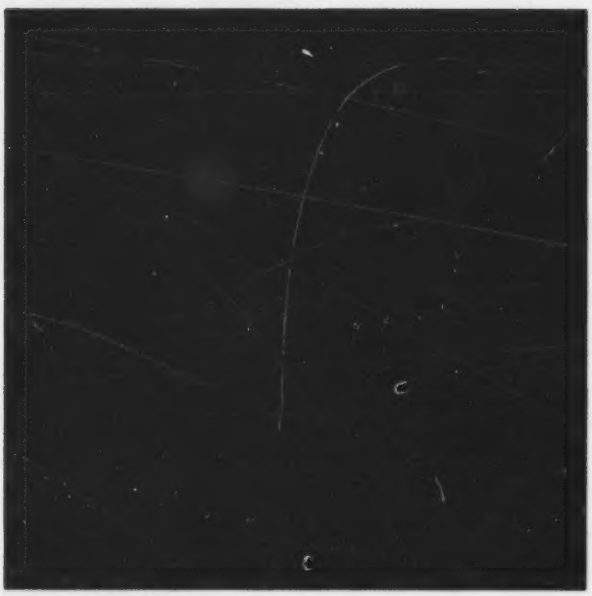
Musk Thistle

Thistle, musk (Carduus nutans L.)

A biennial found in lawns as a rosette. Leaves are free of hair and have a light colored midrib. Leaf margins are usually edged in grey-green. Spiny. Flowers are large, powder puff in shape, and usually deep rose to violet in color.

Other thistles found in lawns include flodman (Cirsium flodman Rydb.) and bull (Cirsium vulgare Savi.).



Nebr. Dept. of Agric.

Prostrate Vervain

Vervain, prostrate (Verbena bracteata Lag.)

A warm season annual that may on occasion act as a perennial. Low growing, hairy throughout. Stems branch freely in all directions, forming circular patterns of growth. Leaves vary in size and form, often are wedge-shaped and toothed. Taproot. Small funnel-form flowers are blue to purple.

Uni. of Nebraska

Violet

Violets (Viola spp.)

Cool season perennials that are among the first plants to bloom in the spring. Prefer at least partial shade. Flower color varies from very light blue to deep purple. Occasionally become troublesome in lawns. Numerous species common to our region.

Waterleaf (Ellisia nyctelea L.)

Cool season spring annual. Grows almost entirely in the shade of trees, shrubs and herbaceous perennials. Small white flowers; leaves are grey-green.

Other common names: Ellisia, nyctelea, waterpod.

Uni. of Nebraska

Waterleaf

Woodsorrel, yellow (Oxalis stricta L.)

Classified as a perennial but more often performs as a warm season annual. Stems branch from the base. The leaves are palmately divided into three leaflets giving a cloverlike appearance. Funnel-form flowers are yellow (in some species violet). The seed pod is cylindrical, 5-sided and pointed. The plants contain soluble oxalates which give it a rather pleasing sour taste.

Uni. of Nebraska

Yellow Woodsorrel

Yarrow, common (Achillea millefolium L.)

Perennial. May grow one to two feet tall. Leaves are soft, finely divided, fern-like. Stems and leaves are covered with grayish-green fine hairs. Flowers are mostly white forming a flat flower-cluster. Entire plant is rather strongly scented.

Western yarrow (Achillea lanulosa Nutt.) also is common in the region.

Purdue University

Yarrow

Management as a Weed Control Tool

Proper management can do much to encourage lawn grasses and discourage weeds.

Mowing at a height of 2 to 3 inches shades the soil and protects bluegrass roots from damaging effects of summer heat. High mowing of common Kentucky bluegrass is an excellent deterrent to the germination and growth of many annual weed species. Some of the newer lawn grasses perform best when mowed less than 2 inches.

Feeding programs that furnish lawn grasses with necessary plant food elements throughout the growing season tend to discourage weeds through competition furnished by more vigorous turf. Fertilize cool season grasses in the fall and spring and as needed during the summer months.

Withhold spring fertilization of *warm* season zoysia, buffalo, and Bermuda until May 1; stop fertilizing them about mid August.

Watering will aid grass to survive drought periods. Water bluegrass as soon as it develops a blue-green cast. Applications of water before moisture shortage symptoms appear is desirable. Soak soil to a depth of 5 inches. Avoid light sprinklings.

Seed and sod free of weed seed and off-type grasses is one of the first steps in weed control. Many lawns contain undesirable coarse grasses and weeds because they were present in the sod or seed. If you buy grass seed, study the label to make certain undesirable weeds and grasses are not present. Cultivated sod, inspected and treated to reduce weeds, is becoming more plentiful.

Control Methods

Mechanical Control

Digging and pulling are simple, effective ways of controlling a few scattered weeds. Dandelions should be cut 2" to 4" below the crown to reduce regrowth. Pulling of most species works best following a heavy rain or after deep watering.

Undercut and cut around small patches of undesirable grass with a sharp spade. Lift the undesirable patch and use it as a pattern to cut a replacement piece the same thickness from an inconspicuous place elsewhere in the lawn. Make certain the replacement sod is firmed into place and well watered until it becomes established.

Preemergence Weed Control

Chemicals applied to the soil to stop growth of seed are preemergence herbicides. They work best on annuals and also control some perennials starting from seed. Most preemergence products have little effect on emerged seedlings.

Proper lawn preparation is essential for optimum performance of preemergence products. Preparation for preemergence chemicals includes three simple steps:

1. Remove trash, leaves, and excess dead grass from the lawn. If power raking is planned, do it as part of the lawn preparation for preemergence chemicals.

2. Apply the preemergence product as directed on the bag or container. Distribute evenly. Double coverage at half rate in two directions assures more even distribution than a full rate applied in a single application.

3. After application, water the lawn. Watering moves the chemical into the soil where it can perform the intended job on germinating weed seeds.

Table 1 shows the most effective times of application. In general, preemergence applications are made in the very early spring for the control of cool season weeds and in mid-spring for warm season annuals.

Products designed for preemergence weed control are labeled "Preemergence," "Preemergent" or "Preventer." Most preemergence herbicides sold for lawn use are bought as granules ready for application. The amount of active ingredient per 1,000 square feet or per acre is given as an aid for treating large areas with concentrated formulations.

Arsenicals, usually in the form of arsenic trioxide, lead arsenate and calcium arsenate, are used for long term control of crabgrass and other annuals in turf. The compounds are highly toxic to warm-blooded animals. Safer products are available for homeowners. Injury to bluegrass also has been observed. Arsenicals act by replacing phosphorus, an essential plant food nutrient, in seedling grasses. The main use of arsenicals is by turf managers for crabgrass and annual bluegrass control.

Azak is a carbamate herbicide known by the common name terbutol. It can be used on all common lawn grasses; it does not control broadleaf species. After spring use, delay reseeding operations until fall. The suggested rate is 5 ounces of 80% wetable powder per 1,000 square feet or 10 lbs of active ingredient per acre.

Balan has the common name benefin. It controls annual grasses in most perennial turf grasses but should not be used on bentgrass. Use only on well established turf. Do not reseed until six to eight weeks after application. Suggested rate is 1½ lbs. of active ingredient per acre or ½ ounce per 1,000 sq. ft.

Bandane is closely related to the insecticide chlordane. It gives control of ants, grubs and certain other insects. It controls primarily annual grasses in well managed bluegrass; it is less effective in mediocre turf. Suggested rates are ¾ to 1 lb. of active ingredient per 1,000 sq. ft.

Betasan is an organic phosphate herbicide also known as bensulide. It controls annual grasses in established cool season turf. Reseeding should not be attempted for 4 months after application. Suggested rates are 12 lbs. active ingredient per acre or 5 lbs. of 5¾% granules per 1,000 sq. ft.

Dacthal has the common designation DCPA. It is especially effective on germinating grasses and also the seed of certain broadleaf species including chickweed and purslane. Dacthal is used extensively for weed control in ornamentals, small

fruits, and in some farm crops. Do not use on new grass until after the first mowing. Reseeding to grass should be delayed for 10 to 12 weeks after using. Suggested rate is 10 to 12 lbs. active ingredient per acre or 6 oz. of 75% wettable powder per 1,000 sq. ft.

Tupersan is a substituted urea compound known also as siduron. It effectively controls most annual warm season weedy grasses and has the unique quality of not interfering with the germination of newly seeded cool season perennial grasses which include bluegrass. On established turf, use 10 to 12 lbs. of active ingredient per acre or 8 ozs. of 50% wettable powder per 1,000 sq. ft.

Postemergence Chemical Control

The application of weed killers to unwanted emerged plants is referred to as postemergence weed control. 2,4-D, dicamba, silvex, MCPA and MCPP weed killers are selective postemergence herbicides. They selectively control broadleaf weeds and have little or no effect on desirable lawn grasses.

Many selective herbicides are growth regulators. They interfere with the normal processes within some plants by upsetting delicate hormone balances. These imbalances result in distorted growth and ruptured cells. Food movement is impaired and eventually death results.

Hormone-type herbicides, if not properly used, can cause injury or kill desirable flowers, shrubs, trees, and gardens.

The more common postemergence herbicides include:

2,4-D (2,4-dichlorophenoxyacetic acid), a growth regulating hormone compound. 2,4-D is formulated principally as salts and esters and is sold under a wide variety of trade names. It is available as liquids, tablets, powders, wax bars and granules. The use of ester formulations should be avoided because of the hazards of fume damage to other plants in the vicinity.

2,4,5-T (2,4,5-trichlorophenoxyacetic acid) is similar to 2,4-D in makeup and action. It is more effective on some species such as wild rose, white clover, and horse nettle but less effective than 2,4-D on certain other species. 2,4,5-T is often sold in combination with 2,4-D for chickweed and clover control.

Silvex (2,4,5-trichlorophenoxypropionic acid) is closely related to 2,4,5-T and is sometimes referred to as 2,4,5-TP. It is generally effective on the same species as 2,4,5-T and in addition is more effective on additional species.

MCPA (2-methyl-4-chlorophenoxyacetic acid) and **MCPP** or mecoprop (2-methyl-4-chlorophenoxyproprionic acid) are herbicides similar to 2,4-D, silvex, and 2,4,5-T. At higher rates, they are less likely to cause noticeable adverse effects on grasses than similar rates of 2,4-D and silvex.

Dicamba (2-methoxy-3,6-dichlorobenzoic acid) is merchandized as Banvel or mixtures with 2,4-D. Its activity in plants is similar to the action of 2,4-D. Severe injury can occur to susceptible plants by root uptake. It is more effective on clovers, chickweeds, knotweed, and red sorrel than most other herbicides.

Dalapon (2,2-dichloropropionic acid) is sold under the trade name Dowpon. It shows greatest activity on grasses. Dalapon must be used as a "spot treatment" on clumps or patches of undesirable grass since it is not selective and kills all grasses.

Arsonates are also known collectively as organic arsenicals. The principal products are DSMA (disodium methanearsonate), MSMA (monosodium acid methanearsonate) and MAMA (monoammonium methanearsonate). The arsonates are used to control annual grassy weeds such as crabgrass and foxtail found in perennial grasses. They kill mostly by foliage contact but also move within some plants to a limited extent. Arsonates have proven effective for nutsedge control.

Amitrole (3-amino-1,2,4-triazole) inhibits chlorophyll formation in plants. It is used for spot treatment to destroy undesirable plants and for total vegetation control.

Cacodylic acid (dimenthylarsinic acid) destroys vegetation upon contact and is used for total vegetation control. Several applications are necessary for control of persistent perennials such as smooth brome and tall fescue.

Herbicide Formulations

Postemergence herbicides are applied as liquids and solids.

Liquids—Esters and Salts

Liquids of the hormone type are normally esters or amine salts. Ester formulations may be low-volatile or high-volatile. Low volatile esters release a minimum amount of fumes at temperatures below 85° F.; high volatile esters give off fumes at lower temperatures. Air temperatures can be misleading since temperatures at the lawn surface may be 20 to 40 degrees higher. Salt formulations—lithium and amine—are less hazardous because they do not give off damaging fumes.

No ester formulation is safe to use around ornamentals because of volatilization or vapor hazards.

Wind movement of spray particles is equal on both esters and salts.

Read labels carefully and select the very safest formulations and products available. Proper use begins with selection of the correct weed killer and a safe formulation.

Under no condition should it be necessary for a homeowner to control weeds with highly toxic products. Such products bear the skull and crossbones and the word "Danger" on the label. Avoid their use.

Solids—Bars and Granules

Solid formulations commonly available are granules and wax bars. Both of these formulations provide effective weed control and reduce risk to desirable ornamentals and vegetable gardens.

Granular formulations work most satisfactorily when applied in late evening or early morning, when weed species are damp. Sprinkling with water before application also provides the necessary conditions for granular adherence and effective control.

Follow directions closely when using wax bar formulations. Temperatures above 85° F. can cause excessive application and "scorching" of the lawn grass.

Liquid Application

Liquid applicators can be classified into two groups—gravity flow and pressure.

Gravity Flow

Gravity flow liquid applicators are most desirable for the average homeowner. They are simple to operate, low in upkeep and initial cost, and eliminate drift of fine droplets of spray which could cause damage to ornamentals, fruits, and vegetables.

The simplest and least expensive gravity flow applicator is a plastic **sprinkle nozzle** that fits into a gallon jug. The jug is filled with the proper mixture of water and weed killer. When inverted, the mixture comes out in a uniform spray. Precision application can be obtained by first making a test run with water to determine the area covered at the normal walking speed.

Cane tubes equipped with a push type dispenser on the bottom end are popular for treating a few scattered weeds. Cane tubes are usually about 30" long. They are filled with water and herbicide. When the cane tube is pressed down on a plant, the dispenser releases a squirt of weed killer mixture. Premeasured weed killer tablets are available for use in cane tubes; however, liquid formulations will serve just as satisfactorily.

Liquid spreaders that work on the same principle as granular applicators are in the developmental stage. The most successful type employs a whirling disc which "throws" the weed killer mixture in a precision pattern.

"Brush and can" systems are convenient methods for treating small patches or a few individual plants. The herbicide mixture is simply "painted" or "daubed on" plants marked for elimination. The "brush and can" method works well for spot treating unwanted clumps or patches of grass. Use an inexpensive paint brush or a cloth or sponge dauber.

Pressure Systems

Pressure applicators are of two types—air pressure and water pressure. Air pressure sprayers require a sealed tank, pump, and nozzle. Water pressure sprayers are commonly known as "hose end" sprayers. They use water pressure to force distribution of the material.

Misuse of pressure type applicators accounts for a considerable share of the weed-killer spray drift injury that occurs in urban neighborhoods. When using pressure sprayers, operate the equipment with as low a pressure as possible. Lower pressures increase spray droplet size and thereby reduce the possibility of drift. *Never operate pressure spray equipment in urban areas when wind movement is greater than 5 mph.*

The application of herbicides with hose-end units is difficult to control. Wrestling with the water hose and lack of precision placement with hose-end applicators makes for misapplication.

The use of gravity flow units is encouraged for herbicide use. Save hose-end units for the application of insecticides, fungicides, and liquid fertilizers.

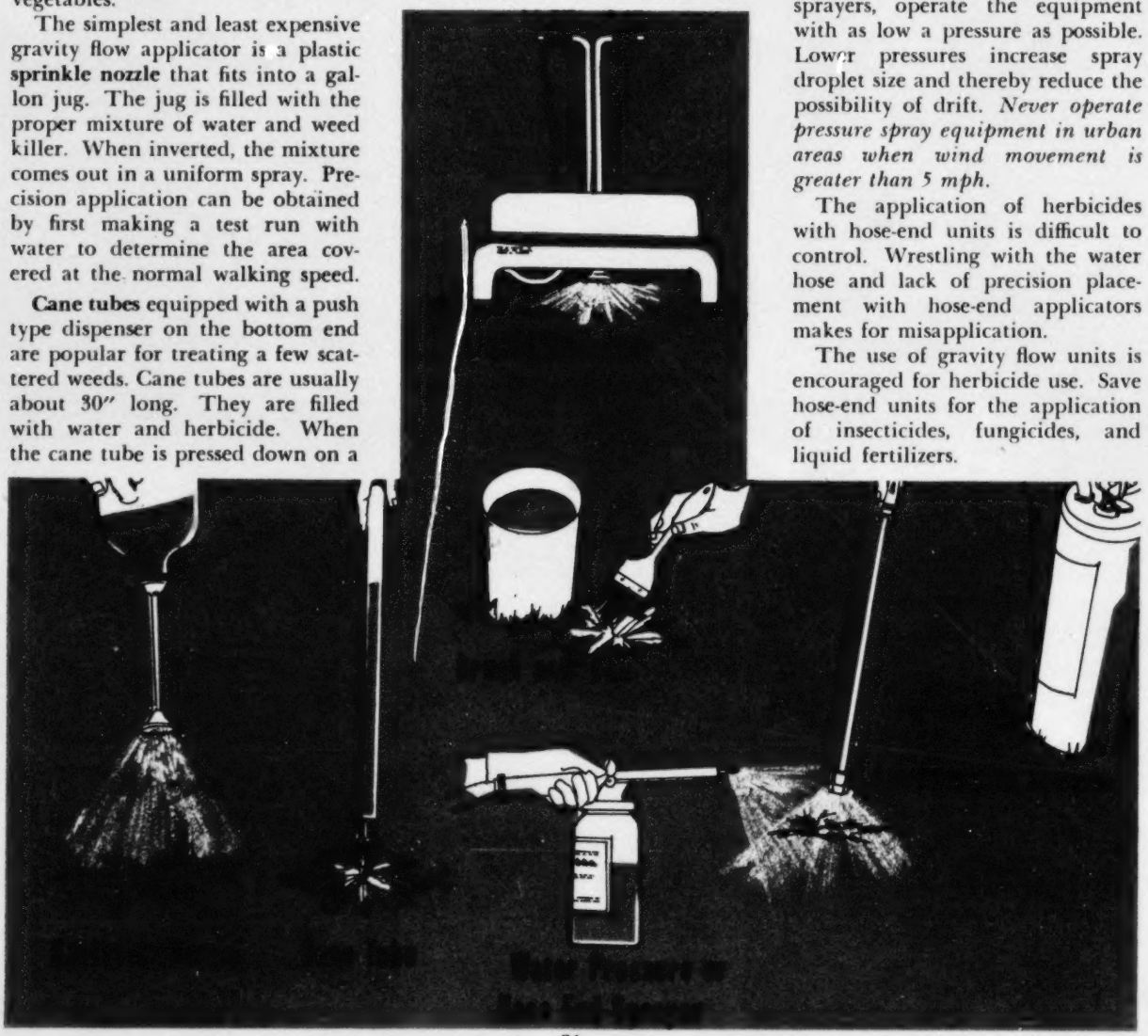
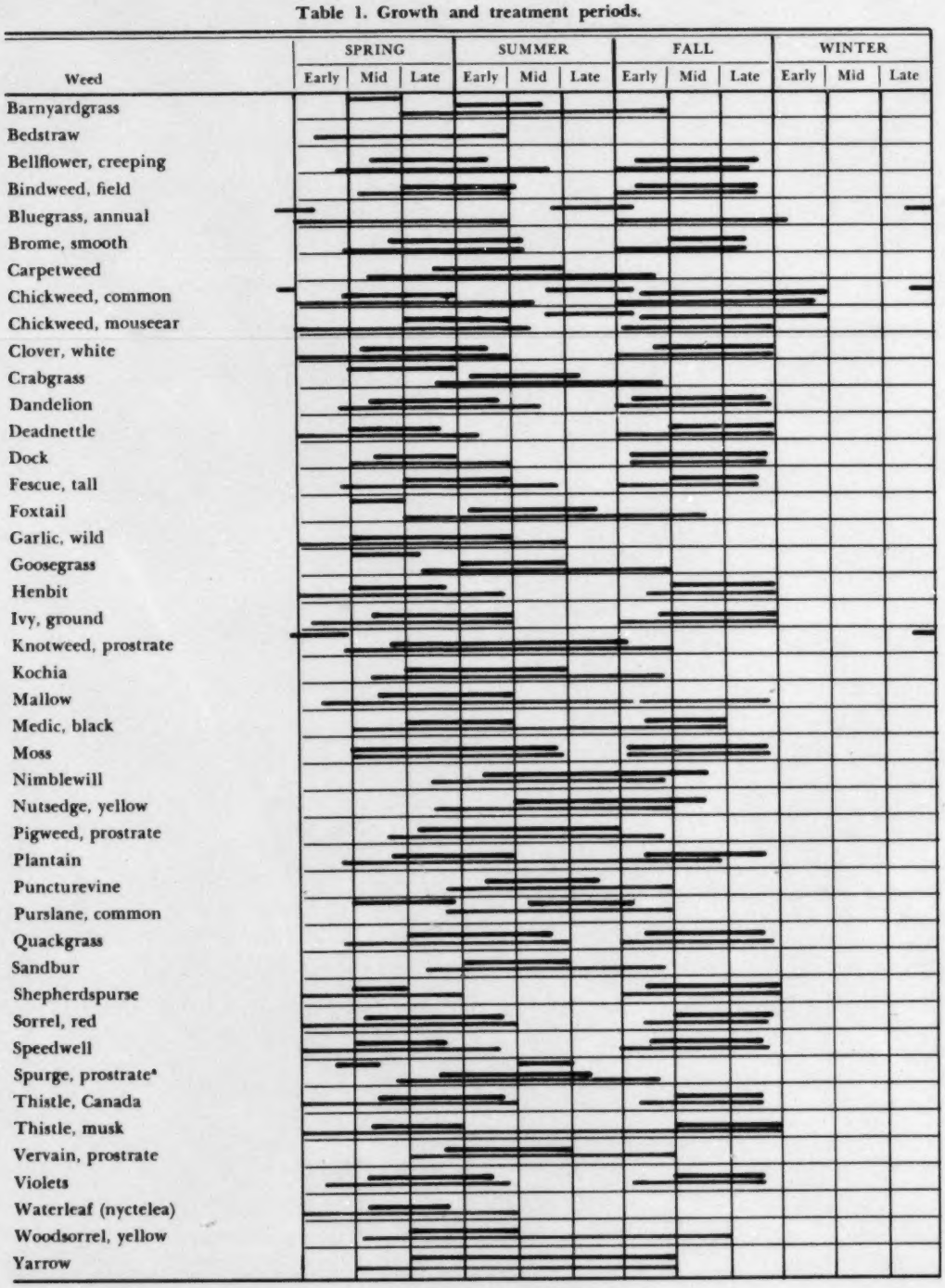


Table 1. Growth and treatment periods.



——= Active period of plant growth. Varies from year to year and from north to south.

——= Apply preemergence chemicals.

——= Apply postemergence treatments. Approximate periods may vary two weeks from season to season. Use granular or wax bar formulations of 2,4-D, Banvel D, Silvex, and 2,4,5-T from late spring through early fall.

* Preemergence herbicide applications should be made a second time in late June or early July.

Table 2. Weed response to herbicides.

Weed	Preemergence[a] control	Postemergence control[b]	
		1st choice	2nd choice
Barnyardgrass	Yes	Arsonates	
Bedstraw	No	Silvex	Banvel
Bellflower, creeping	No	Banvel	
Bindweed, field	No	2,4-D	Banvel
Bluegrass, annual	Yes		
	Betasan, Dacthal		
Brome, smooth	No	Banvel[c]	Dalapon[d]
Carpetweed	No	Banvel, Silvex	2,4-D
Chickweed, common	Some	Silvex, Banvel	Arsonates
Chickweed, mouseear	Some	Silvex, Banvel	Arsonates
Clover, white	No	Silvex, Banvel	
Crabgrass	Yes	Arsonates	Kerosene[e]
Dandelion	Seedlings	2,4-D	
Deadnettle	No	Banvel	
Dock	No	Banvel	2,4-D
Fescue, tall	No	Dalapon[d]	
Foxtail	Yes	Arsonates	
Garlic, wild	No	Banvel	2,4-D
Goosegrass	Yes	Arsonates	
Henbit	No	Silvex	Banvel
Ivy, ground	No	Silvex	Banvel, 2,4-D
Knotweed, prostrate	Yes	Banvel	2,4-D (early)
Kochia	No	2,4-D	
Mallow	No	2,4-D (Fair)	
Medic, black	No	Silvex	Banvel
Moss	No	Cu So_4[f]	
Nimblewill	Seedlings	Arsonate + 2,4-D[g]	Dalapon[d] or amitrole[d]
Nutsedge, yellow	No	Arsonates	
Pigweed, prostrate	Some	2,4-D	Banvel
Plantain	No	2,4-D	Silvex
Puncturevine	No	2,4-D	Oil (wet plants)
Purslane, common	Yes	Banvel	Silvex
	Benefin, Dacthal		
Quackgrass	No	No selective chemical	Spot treat with dalapon[d]
Sandbur	Some	Arsonates	
Shepherdspurse	No	2,4-D early	2,4,5-T
Sorrel, red	No	Banvel	
Speedwell		Dacthal[h]	Banvel
Spurge, prostrate	Some[i]	Banvel	Silvex
Thistle, Canada	No	Banvel	2,4-D
Thistle, musk	No	2,4-D	
Vervain, prostrate	No	2,4-D	
Violet	No	Silvex	
Waterleaf (nyctelea)	No	Silvex	
Woodsorrel, yellow	Seedlings	Banvel	Silvex
Yarrow	No	Banvel	

[a] See Pages 19–20 for discussion of herbicides commonly sold for preemergence control. Products are listed where superiority has been noted on specific weeds. Follow manufacturer's recommendations on rates.

[b] Follow manufacturer's recommendations on rates. Use wax bars and granular formulations of 2,4-D, Banvel, 2,4,5-T, and silvex from late spring through early fall to reduce danger of herbicide drift and injury to trees, shrubs, and gardens. Banvel injury to susceptible plants can occur by root uptake.

[c] Treat individual plants. *Do not* spray entire lawn. Use 6 tablespoons Banvel concentrate per gallon of water and apply as a wetting spray.

[d] Treat individual plants. Do not spray entire lawn. Dalapon and amitrole kill all grasses. Use ¼ #/gal. water.

[e] 1 quart of water-white kerosene per 100 square feet.

[f] 1 ounce copper sulfate per gallon of water to 200 square feet.

[g] Arsonate at heaviest crabgrass control rate, 2,4-D amine at dandelion rate. Make three treatments 10 days apart.

[h] Preliminary results favorable. Use 6 ounces Dacthal 75W per 1,000 square feet.

[i] A second preemergence treatment in late June or early July would be beneficial.

Use Pesticides Safely

FOLLOW THE LABEL

—Identify your weed problem.

—Select the proper weed killer for the job and season (Table 2). Consider safety to humans, pets, lawns, and ornamentals.

—Study the container label, accompanying literature, and bulletins.

—Carefully check weather conditions.
  —temperature
  —wind velocity and direction

—Consult with neighbors before making application.

—Apply exactly as directed.

—Clean up afterwards
  —wash exposed portions of the body
  —clean equipment
  —change clothes.

—Safely dispose of empty containers.

—Keep and store all pesticides in their original labeled containers out of the reach of children and irresponsible adults.